

CLAIMS

1. A thin film forming method which generates a particulate thin film material, introduces and deposits the particulate thin film material, which is generated, on a principal surface of a substrate, and forms a thin film, characterized by supporting the substrate so that a first principal surface and its backside (hereafter, this is called a second principal surface) may be exposed, generating the particulate thin film material on an extension of an in-plane direction of the first principal surface of the substrate, and introducing the particulate thin film material, which is generated, on the first principal surface and the second principal surface of the substrate.

2. The thin film forming method according to claim 1, characterized by introducing the particulate thin film material so as to diverge it and increase density as it approaches on the first principal surface and the second principal surface of the substrate.

3. The thin film forming method according to claim 1 or 2, characterized by depositing the thin film material with rotating the substrate with making a normal direction of the first principal surface as a rotation axis.

4. The thin film forming method according to any one of claims 1 to 3, characterized by arranging heaters on the first principal surface and the second principal surface of the substrate and heating the substrate.

5. The thin film forming method according to any one of claims 1 to 4, characterized by generating the particulate thin film material from a material used for formation of an oxide superconductor.

6. A thin film forming apparatus which is equipped with a target constructed of a thin film material, a cathode for generating a particulate thin film material from the target, a supporting member for supporting the substrate on which the particulate thin film material is to be deposited, a heater for heating the substrate, and a guide for introducing the particulate thin film material onto a surface of the substrate where the thin film material is deposited, characterized in that the supporting member supports the substrate so as to expose the first principal surface and its backside (second principal surface) of the substrate, the target is disposed in a position for producing the particulate thin film material in an extension of an in-plane direction of the first principal surface of the substrate, and the guide is disposed on the first principal surface and the second principal surface of the substrate.

7. The thin film forming apparatus according to claim 6, characterized in that the guide is constructed of a parallel portion parallel to the first principal surface or the second principal surface of the substrate, and an inclined portion which is separate from the substrate as it goes to the target from the substrate.

8. The thin film forming apparatus according to claim 5 or 6, characterized in that the supporting member comprises a rotating mechanism which rotates the substrate.

9. The thin film forming apparatus according to any one of claims 6 to 8, characterized in that the heater is provided on a surface of each guide which faces the substrate.

10. The thin film forming apparatus according to any one of claims 6 to 9, characterized in that the target is arranged so that the particulate thin film material generated may be incident into the first principal surface and the second principal surface of the substrate at an angle determined beforehand.

11. The thin film forming apparatus according to any one of claims 6 to 10, characterized by comprising the two or more targets.

12. The thin film forming apparatus according to any one of claims 6 to 11, characterized in that the target is constructed of a material used for formation of an oxide superconductor.